

Patent Application of  
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For  
Variable Weight End Structure for Sporting Equipment Handles

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CROSS-REFERENCE TO RELATED APPLICATIONS: Provisional Patent 60/395,022 7/12/2002  
FEDERALLY SPONSORED RESEARCH: None

#### BACKGROUND – FIELD OF INVENTION

This invention relates to an improvement for tennis racquets, golf clubs, and other sporting equipment that employ a handle. Specifically, the improvement is a means to add variable weights to the tail end of a racquet or club. The tail end refers to the end of the handle of a racquet or club.

#### BACKGROUND – DESCRIPTION OF PRIOR ART

The addition of weight to improve playability and feel is a common way to customize racquets or clubs. In fact, many professional players employ some type of custom weighting to improve their racquet or clubs performance. While weighting a racquet/club can have dramatic effects, the placement of the weight is critical to achieve improved performance. For example, application of weight at the tail-end of a racquet or club increases power and control, reduces shock, and maintains swing weight. In contrast, a weight placed at the head or side of a racquet reduces power and control, increases shock, and increases swing weight. Therefore, the preferred placement of a weight to achieve optimum performance is at the tail-end of a racquet or club handle. The amount of weight depends on the particular racquet characteristics, physical ability of a player along with his/her specific desires. The ideal weight would be different for each player. In addition, in a sport such as tennis, a player matches his skill against opponents whose playing styles and physical abilities greatly vary. A successful player is one who will be able to adjust his game to counter that

of his opponent. Therefore, it is very desirable for a player to vary the weight placed on a racquet/club so as to 'tune' his game to current conditions. To be able to vary the weighting of a racquet quickly and efficiently, even during a match, is a great asset.

Unfortunately, no methods currently exist that allow a player to easily attach variable weight to the tail-end of a racquet or club. Current techniques promoted by the sporting industry, involve disassembly of the racquet handle (removing grip and butt cap) and adding weight along with cotton padding inside the handle. Not only is this method cumbersome and time consuming, the method requires a racquet/club with a hollow handle to hold the weight. If a handle is solid, the player must gouge out a cavity or not use a weight.

Another technique used and cited in Patent 5,997,421, "Counter-weighting handle grip", requires the player to wrap lead/felt tape beneath a golf club handle grip. This method is cumbersome, increases grip size, and doesn't place the weight at the ideal tail-end location of a handle.

In U.S. Pat. No. 5,058,902 to McCutchen (1991), a static distal butt weight for a tennis racquet handle, for the purpose, among others, of extending the center of percussion, absorbing shock, and increasing the momentum of the racquet. This method is not a variable weighting method, but rather adds one fixed weight to the racquet handle

U.S. Pat. No. 5,094,453 to Douglas et al. (1992) shows a tennis racquet with a solid butt weight attached to its handle end by means of an "acorn shaped weighted extension" (4) attachable to the end of the handle by welding or screwing it on (5:8). Once again this is not a variable method to add weight to the tail end of a racquet or club.

U.S. Pat. No. 4,984,793 to Chen (1991) teaches an elongated rubber sheath over a conventional butt cap, the sheath extending up the handle with numerous recesses for containing small individual optional weights under the player's hand. This method does not provide a means to quickly and easily change weight. Additionally, the weight placement is in the handle not at the optimum location of the tail-end.

In conclusion, solutions of prior art for weighting the tail end of a racquet or club, all pertain to fixed or static weighting and do not address the fundamental difficulty of allowing a player to efficiently and easily change the weight on the fly or even during play. Insofar as we are aware, no sporting racquet/club handle mechanism formerly developed provides a means to quickly and easily vary the weight located at the tail end of a handle.

## OBJECTS AND ADVANTAGES

Accordingly, several objects and advantages of the present invention are:

1. to provide custom tail-end weighting;
2. to provide variable weighting;
3. to provide rapid user-friendly weight adjustments;
4. to provide weighting in an economical manner.

Still further objects and advantages will become apparent from a study of the following description and the accompanying drawings.

## DRAWINGS AND FIGURES

FIG. 1 is a perspective view of the variable weight end structure for tennis racquets.

FIG. 2 is a exploded view of the variable weight end structure constructed in accordance with the invention, showing the interface element, weighting element, and securing mechanism.

FIG. 3 is a side view of the interface element.

FIG. 4 is a side view of the weighting element.

## LIST OF REFERENCE NUMERALS

- 10 Variable weight end structure
- 11 Cap
- 12 Cap Slot
- 13 Locking tab (outside cap)
- 14 Plug
- 15 Sleeve
- 16 Locking tab (inside cavity)
- 17 Interface Element
- 18 Weight Element
- 19 Cavity

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENT OF INVENTION

A typical embodiment of the variable weight end structure 10 is illustrated in FIG.1 (perspective view). FIG. 2 is an exploded view of the variable weight end structure 10 showing the interface element 17, weight element 18 and securing mechanism. In this embodiment the interface element 17 is comprised of a sleeve 15, and cavity 19. The sleeve 15 is tapered and notched to slide over a racquet handle or club. The sleeve 15 is secured to a handle using glue or staples. At the other side of interface element 17 is the cavity 19 that holds the weight element 18. The securing mechanism to hold weight element 18 inside cavity 19 is a cap 11. The cap 11 has a slot 12 that is used to rotate cap during plug 14 removal and replacement. There are locking tabs 13/16 on the outside of cap 11 and inside of cavity 19 to firmly secure cap to interface element 17 and hold weight element 18 firmly in place. The weighting element 18 in this embodiment is a solid plug 14. A set of plugs 14 can be made each having a different weight by using materials with different densities (lead, brass, pewter, or plastic) or removing varying amounts of material from the center of plug 14.

There are various embodiments with regard to the securing mechanism of weight element 17 to interface element 18. A second embodiment uses a threaded screw and nut through the center of cap 11 and plug 14 in place of locking tabs 13/16. Additionally, the weight element 17 could consist of round or disk-shaped sub-elements attached or stacked together.

## DESCRIPTION - OPERATION

In operation a player uses the variable weight end structure 10 in a manner similar to current tennis racquet butt caps. The variable weight end structure 10 replaces the standard butt cap and is attached using the same techniques employed for standard butt caps making installation very easy. The variable weight end structure 10 maintains the same shape and form fit as a standard butt cap so that a player feels no difference in his grip.

The player, when desired, may change the performance characteristic of his racquet by changing the plug weight 14 at the end of the racquet. This is done by replacing the plug 14 with a second plug 14 of different weight. If desired the player can choose not to tail-weight by not placing a plug 14 in the sleeve 15.

When changing out a plug 14 the player uses slot 12 to rotate cap 11 counterclockwise to release locking tabs 13/16. Once released, the cap 11 and plug 14 are removed from the sleeve 15. A new different weight plug 14 or no plug may be placed in the sleeve 15. The cap 11 is placed over the plug 14 and rotated to

engage locking tabs 13/16 to secure plug 14 and cap 11.

A player can change the plug 14 quickly and easily so that weight changes can be performed even during play. A player therefore can make rapid adjustments to his racquet to optimize his play against opponents or current playing conditions.

#### SUMMARY, RAMIFICATIONS, AND SCOPE

Accordingly, the reader will see that the invention, a variable weight end structure 10, has an interface element 17 and a weighting element 18. The variable weight end structure 10 attaches to sporting equipment handles so that a player can quickly and easily add and vary tail-end weighting.

Although the description above contains many specificities, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments of this invention.

Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the examples given